Analysis and Uncertainty Plan:

1) Step 1 should be the Problem statement and project goals/objectives:

Example: Develop a site-specific selenium water column criterion that protects all aquatic life in Lake Koocanusa.

1. Background – What is an analysis plan in the context of ecological risk assessment and how is it being used here in the context of WQC/WQO development for Lake Koocanusa?

Characterization of Lake Koocanusa Watershed:

General Lake Characteristics

- Lake Map with general statistics width + depth @ seasonal hydrology, other stats?
- Discussion on how the reservoir might be divided for selenium modeling purposes.

Watershed Characteristics

- Lake Tributaries (if notable)
- Downstream Kootenai
    - available information and data (e.g., recent fish tissue data)

Water Quality Stations (series of maps) with summary explanations

- May also want to consider a table or series of tables documenting existing monitoring data for each station broken out by year/media

Characterization of selenium data for Lake Koocanusa aquatic communities (biological tissues)

- Fish community overview trophic and habitat relationships in Lake Koocanusa
    - Historic Fisheries and Tissue Data (pre-2014?)
    - Overview of fish tissue data collection over timeframe for data considered in model
    - Temporal/spatial species-specific statistical comparisons for fish tissue(s)
- Invertebrate Communities
    - Zooplankton
    - Macroinvertebrates
    - Overview of fish tissue data collection over timeframe for data considered in model
    - Temporal and spatial statistical comparisons for invertebrates
- Algal Community
    - Phytoplankton

- Detritus/sediment (need separate characterization?)

- Temporal and spatial statistical comparisons for algae

Characterization of selenium data for water in Lake Koocanusa

- Historic Data (pre-2014?)

- Overview of water data collection over timeframe for data considered in model

- Temporal and spatial statistical comparisons for water

2. Laboratory Studies: Characterization of selenium effects on Lake Koocanusa species and surrogates (use/reference effects assessments in 2016 EPA criteria document)

- Rainbow Trout (also surrogate for kokanee salmon)

- Dolly Varden (surrogate for Bull Trout)

- Westslope cutthroat trout (also surrogate for kokanee salmon)

- Fathead minnow (surrogate for redside shiner, peamouth, and pikeminnow)

- White sturgeon (target species for downstream protection)

3. General definition of the potential analytical approaches

- Bioaccumulation Modeling

    - Equation

    - Components

        - EF

        - TTF

        - CF

- Overview of Bioaccumulation Factor (BAF) approach

    - Equation

    - Components

4. Target Species Selection – use this discussion as a segway between the overview portion and the analysis portion since it is common to both approaches? SeTSC

5. BAF

- Available Data

- Critical Decision Points - – Se TSC discussion/deliberation/decision (see Critical Decision Points Table)

    - Target species

- Target tissue

- Representative [Se] in water

- Model Validation?

- Scenario Development Process

- Derivation and temporal-spatial integration of BAFs

6. Bioaccumulation Modeling

- Available Data – Koocanusa Database

- Critical Decision Points – Se TSC discussion/deliberation/decision (see Critical Decision Points Table)

- Target Species – either in Section 3 or here

- Enrichment factor (EF or K_d) –

- Trophic Transfer Factors (TTF)

- Conversion Factors (CF) – if necessary

- Model Validation

- Scenario Development Process - Se TSC discussion/deliberation/decision

- Derivation and temporal-spatial integration of K_ds

- Derivation and integration of composite TTFs

- Derivation of site specific EFs

- Modeling scenario(s)

7. Presentation of Scenario Options

- BAF - based option(s)

- Option 1

- Option 2

- Bioaccumulation Model – based option(s)

- Option 1

- Option 2

8. Uncertainty Analysis

- BAF

- Bioaccumulation Model